

Bremer AG – Fully automated centralised reinforcement production for flat and structural elements

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Bremer AG, with its headquarters in Paderborn, operates one of the largest precast plants in Germany. The product range of precast concrete elements includes I-trusses, T-trusses and purlins, slabs, beams, trough slabs and columns, but also foundations and walls. The modernisation and rationalisation of the reinforcement production was urgently needed, as the shortage of labour was becoming more and more glaring and a permanent solution had to be found. For the modernisation of the reinforcement production, Prilhofer Consulting was approached to plan a highly automated reinforcement production and logistics using existing halls as well a new building extension.

Prilhofer Consulting started the project together with Bremer with detailed requirement analyses of the reinforcement production, the mesh processes of the reinforcement cages as well as the investigation of existing halls and the possible hall extensions taking into account the space limitations at the location in Paderborn.

As Bremer suffers from space problems just like many other companies, the challenge was to plan the most highly automated reinforcement production and logistics possible using

existing halls and a new building extension. The preliminary work was done by Bremer, and Prilhofer Consulting was finally commissioned to develop the automatic, digital reinforcement production.

Up to now, there were no comparable plants with the desired level of automation and digitalisation. It was therefore necessary to break new ground in this area. This meant that a plant had to be designed which separates the production areas but connects them again over the logistics. This has the advantage that the noise-intensive automated production can be separated from the manual workplaces.

A major challenge was, on the one hand, to accommodate the plant technology in the space that could be generated in the planning and, on the other hand, to create logistics that could temporarily store the prefabricated reinforcement components such as flat reinforcement mesh, steel bars, stirrups and automatically provided cage segments and deliver them just in time and largely automatically when called off from the meshing stations in the two mesh halls. A concept that Bremer initially considered too drastic, involving the partial demolition of the two mesh halls and the addition of a new,



Loading of the transport pallets and transfer to the automated area



Automated storage collecting pallets

partially two-storey hall, was finally accepted unanimously by Bremer and served as the basis for the completion of the tender specifications for the plant technology.

The result is a level of automation for the production of the preliminary products of the reinforcement cages as complete kits that is unprecedented for structural elements. This also includes their automatic storage and provision at the reinforcement mesh stations by means of automatic driverless transport systems for reinforcement stirrups and an automated pallet storage system for steel bars, reinforcement meshes and cage segments.

This also made it possible to use the automated machines and systems in such a way that they can operate at their specified speed. The production of pre-materials such as stirrups, steel bars (straight and bent), reinforcement meshes and mesh cages is then connected to the production through the logistics span. The systems can produce the pre-materials with a 24-hour advance run. These materials are then temporarily stored on a so-called storage transport pallet in the automated logistics span and delivered to the meshing stations as required.

In order to be able to realise the plant concept outlined above, some new developments were necessary, as the existing solutions were only available as island solutions.

In an effort to achieve the greatest possible efficiency in the entire plant, it was necessary to design a layout that integrates all machines and plants in such a way that



Automated mesh storage



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Automated bar cutter

their production capacity can be utilised to the maximum. If all machines and systems have to work in parallel in a network, it is also necessary to control them with a higher-level control system. This required setting up a continuous digitalisation from CAD to the workstation. And all of this, of course, including the automated logistics for the storage transport pallets in the logistics span and the automated transport and storage system for the stirrups.

Plant technology

- Automatic rebar shear line with bending unit
- Automated reinforcement stirrup machines
- Mesh welding machine with automated cage bending and automated storage system
- Automated transport and storage system for stirrups between the automated reinforcement stirrup machines and the logistics span
- Automated transport and storage system for storage transport pallets between production and meshing stations

Control system

- Control system for reading of data (PXML) and conversion for the simple machines
- Data connection from the control system to the individual machines/plants with feedback from the machines/plants
- Connection to the PPS system for data takeover and feedback to the system

Through the new development of the reinforcement production with layout and control technology, including modifications to the buildings, we have managed to achieve the maximum efficiency of the plant technology with the best possible utilisation of the manual meshing stations. A high degree of automation combined with coherent logistics, separation of the noise-generating production of pre-products and the meshing stations, as well as full data continuity from reinforcement planning to the finished product organised by a superordinate control system enable Bremer to achieve an optimal planning capability, efficiency and traceability of the reinforcement production for the large number and quantity



Stirrup preparation

of prefabricated reinforced concrete parts to be produced every day.

The involvement of Prilhofer Consulting was therefore a logical step for Bremer AG in order to analyse all aspects in an overall view and to design a customised, sustainable concept for the further development of the business location. The independent expertise in the process of tendering, contract placement and project management were equally essential for a milestone project of this dimension. ■

FURTHER INFORMATION

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